

CLAIMS

- 5 1. Use of prokaryotic beta recombinase and its specific target sequences in eukaryotic cells.
2. Use of prokaryotic beta recombinase for transgenic work in eukaryotic cells.
- 10 3. Use according to claim 1 or 2 for controlling gene expression in eukaryots.
4. Use according to claim 1 or 2 for manipulating plant genomes in the generation of transgenic plants.
- 15 5. Use according to claim 1 or 2 in which the eukaryotic cells are mammalian cells.
6. Use according to claim 1 or 2 for manipulating pathogenic and Gram positive bacteria.
- 20 7. Use according to any of the previous claim for site-specific intramolecular recombination between two *six* sites in eukaryotic cells.
8. Use according to claim 7 for promotion of two or more different specific recombination events at a time.
- 25 9. Use according to claim 7 for mediating exclusively intramolecular reactions.
10. Use according to claim 7 in which the prokaryotic beta recombinase promotes the deletion of DNA sequences located between directly oriented *six* sites in
30 mammalian cells.

11. Use according to claim 7 in which the prokaryotic beta recombinase promotes the inversion of DNA sequences located between inverted repeated *six* sites in mammalian cells.

5 12. Use according to claim 10 in which the prokaryotic beta recombinase promotes deletion of a DNA fragment laying between two directly oriented *six* sites.

13. Use according to claim 12 in which the prokaryotic beta recombinase promotes inversion of a DNA fragment laying between two inversely oriented *six* sites .

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14. Use according to claim 13 in which the prokaryotic beta recombinase promotes deletion of a DNA fragment laying between direct repeat specific recognition sequences.

15 15. Use according to claim 13 in which the prokaryotic beta recombinase promotes inversion of a DNA fragment laying between inverted repeated specific recognition sequences.

20 16. Use according to claim 10, 11, 12 or 13 in which the specific recognition sequence is located as an extrachromosomal DNA substrate.

17. Use of the gene coding for beta recombinase for catalysing site-specific resolution of DNA sequences in an extrachromosomal target introduced into an eukaryotic cell.

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18. Use of the gene according to claim 17 for catalysing site-specific resolution of DNA sequences when extrachromosomal target is a plasmid.

30 19. Use of the gene according to claim 17 or 18 in which the introduction is made by transfection.

20. Use of the gene according to any of claims 17 to 19 in which the resolution means deletion.
21. Use of the gene according to any of claims 17 to 19 in which the resolution means
5 inversion.
22. Use of the gene according to any of claims 17 to 21 in which the DNA sequences are allocated between the *six* sites.
- 10 23. Use of the gene according to any of claims 17 to 22 when the *six* sites are integrated in the genome as chromatin associated structures.
24. Use of the gene according to any of claims 17 to 22 when the six sites are integrated in the genome and wrapped on a nucleosome, at several locations.
- 15 25. Use according to claim 1 to develop new techniques for gene delivery in human gene therapy.
- 20 26. Method for development of transgenic animals which includes the use of beta recombinase according to any of claims 1-21.